Acetylcholine has multiple facets in brain function and disease

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Preface

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We were delighted to take up the suggestion for a Special Issue on the role of acetylcholine (ACh) in behaviour proposed by the Editorial Office of this journal. By summarising both historical work together with the most recent news about ACh and psychiatric and neurodegenerative disorders, we aim to transmit some of the current excitement about novel applications of cholinergic drugs in diseases. This is best achieved by simultaneous in-depth profiling of basic mechanisms and reviewing of well established principles. Thus, we sought to provide a somewhat balanced compendium of basic and applied research themes. It should not be viewed as being fully comprehensive, but rather a selection that would appeal to a wider audience.

The multitude of effects of ACh is reflected in the diverse topics covered here, and a genuine reflection of its complex importance in brain function. The content is distinguished from the more traditional layout of previous Special Issues on the role of ACh in that some contributions may not obviously fall into the realm of brain and behaviour, but they all highlight important links with the neuronal system and provide a richer understanding of cholinergic function relevant for behavioural output.

When we invited reviews for the different topics, we requested a focal and even personal account and viewpoint and each contribution was expected to stand on its own. All participants happily adhered to this request and we are delighted for their efforts in making this endeavour possible. Editorial influences were kept to a minimum so that each article remains a genuine reflection of the author's approach. Unfortunately, this strategy led to some replication between the chapters but this could not be avoided. However, these repetitions are readily identifiable so much so that the reader may focus her/his interest on the central hypothesis of each contribution.

The Special Issue is divided into 4 parts. Naturally, we start on the history of ACh before taking a closer look at receptor expression, cell groups and their development. Part two concentrates on behavioural outputs and assesses the direct and indirect (or modulatory) roles of ACh and its receptors, while part three highlights the physiological underpinnings of cholinergic brain activity, and at the same time branches out into its trophic function. Due to its multiple roles and wide anatomical presence, abnormal functioning of cholinergic projections or intrinsic networks can have devastating consequences. These are assessed in terms of diseases in the forth and final part. What emerges is a framework that may (i) lead to a richer understanding of brain function and malfunction, (ii) provide insights into novel targets for disease treatment, and (iii) renew the appreciation of ACh as a critical component in many brain functions. Selected original contributions at the end of this issue underline these facets and may provide a flavour of future work.

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